

State Hazard Mitigation and Climate Adaptation Plan and Efforts Related to MassDEP Programs

Waste Site Cleanup Advisory Committee Meeting

Thursday, September 27, 2018

Massachusetts Department of Environmental Protection, Boston

Thomas M. Potter

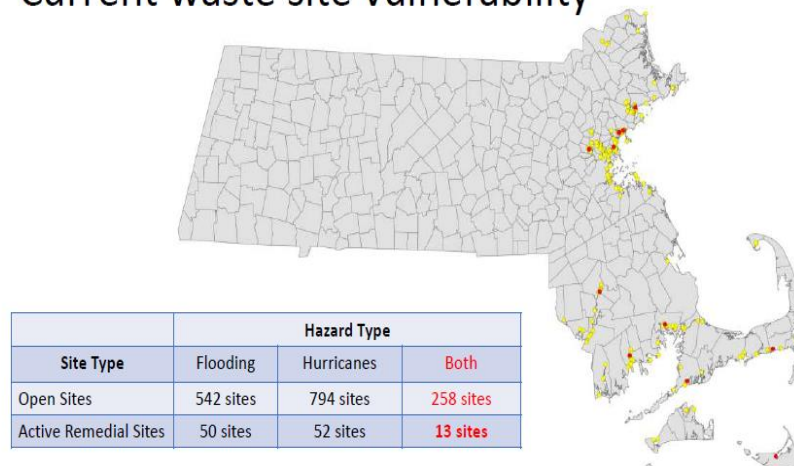
MassDEP Bureau of Waste Site Cleanup
Division of Policy and Program Development
Chief, Clean Energy Development Coordinator

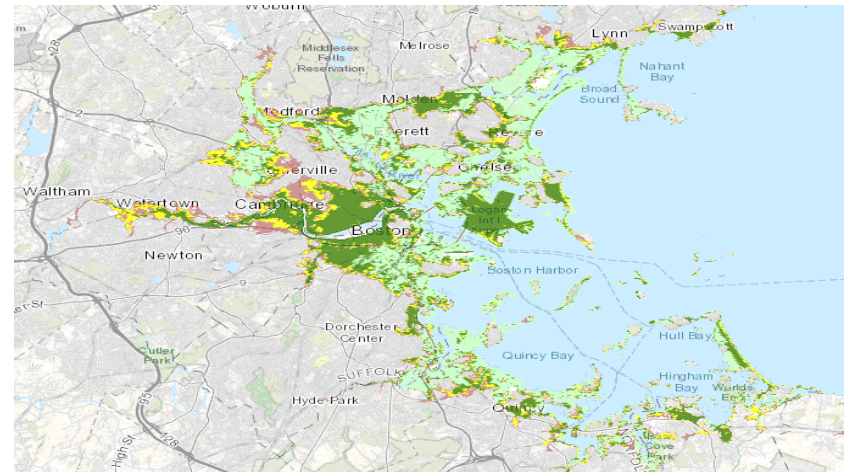
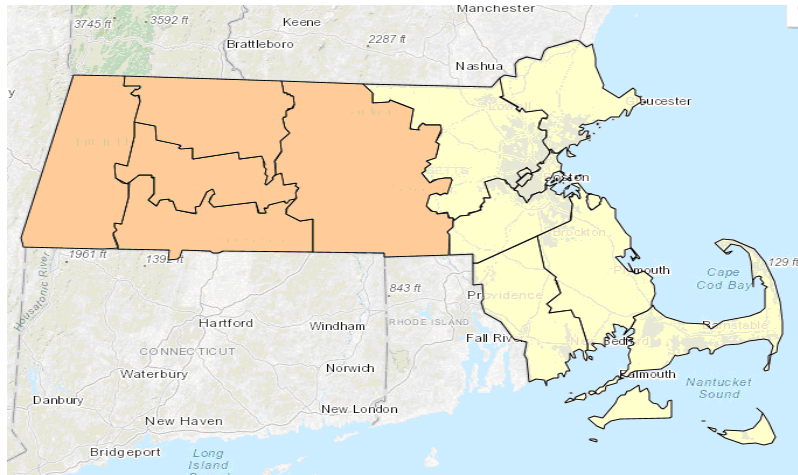
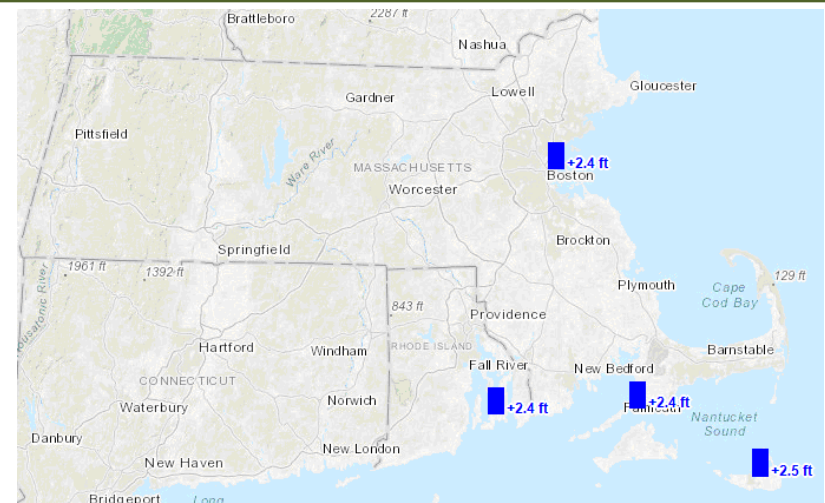
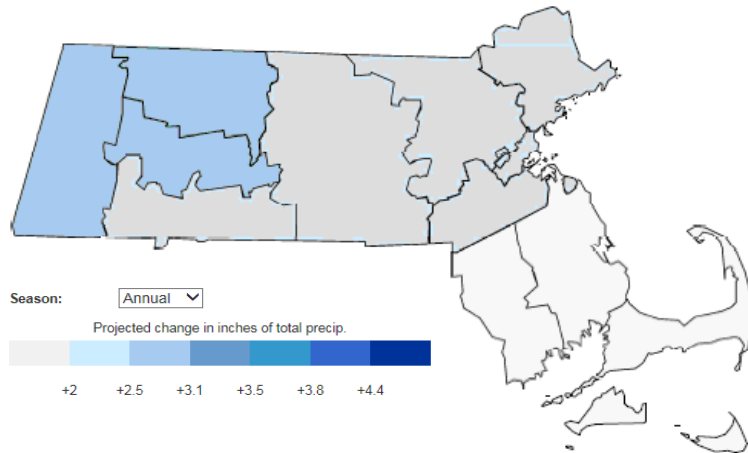


AGENDA

- **Waste Site Concerns**
 - Climate Impacts
 - Remedial Considerations
- **MA State Plans**
- **BWSC Initiatives**
 - Vulnerability Assessments
 - Natural Resource Damages
 - Adaptation Considerations
- **National Initiatives**
 - Other States
 - ASTM

Current waste site vulnerability



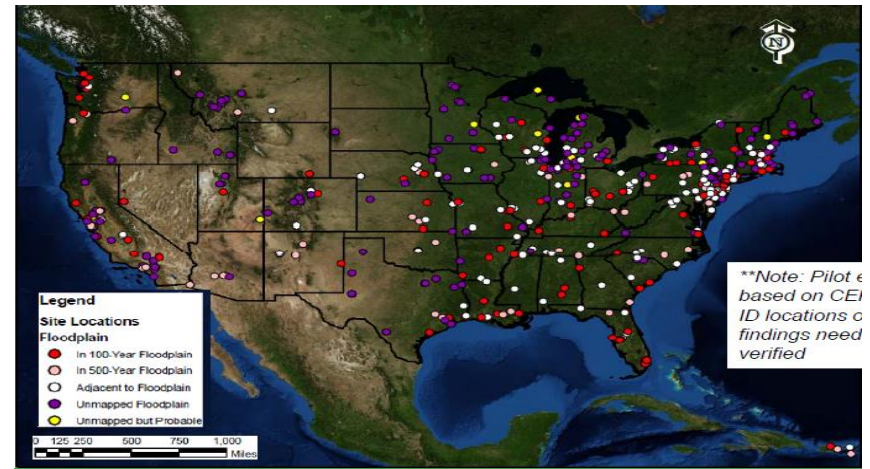


Legend

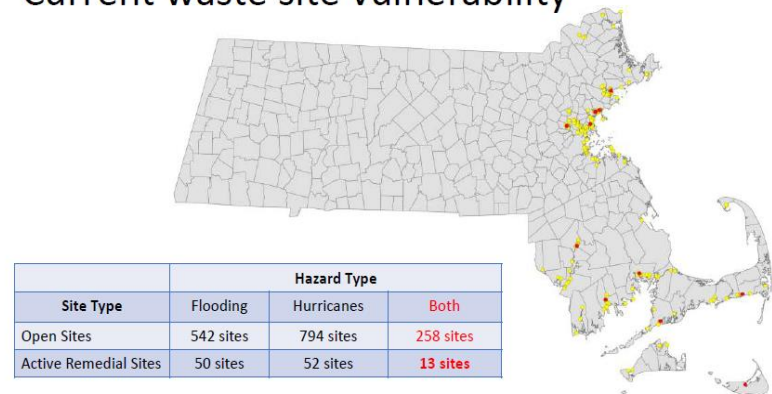
Impact	Effect	Remedial Consideration
Increased Precipitation	Storms, Flooding, Run-off issues	<ul style="list-style-type: none"> • Mobilization of Contaminants • Damage to capping approaches
Sea Level Rise	Erosion, Site Inundation, Mobilization of Contaminants	<ul style="list-style-type: none"> • Site damage • Mixing, loss of contaminate material • Clean sediments topping contaminated sediments
Rising Temperatures	Altered degradation, Heat Stress	<ul style="list-style-type: none"> • Increase/decrease in toxicity • System operation/power
Extreme Weather/Hurricanes	Scour, Flooding, Power Loss	<ul style="list-style-type: none"> • Damage to site integrity, capping systems • Possible dilution of contaminants • System operation/Power

What We Did

- **2016** BU Independent Study – *Climate Change/Global Warming Project*
- **2017** BU Independent Study – *Hazardous Waste Site Vulnerability Assessment*
 - Waste Site Vulnerability
 - 3,772 Open Sites
 - 443 Active Sites



Current waste site vulnerability



2018 State Hazard Mitigation and Climate Adaptation Plan

- MassDEP
- Vulnerability Assessment of Hazardous Waste Sites
- Less than 3 years
- Precipitation changes, Sea Level Rise, Rising Temperatures, Extreme Weather, Earthquakes
- (page 7-17)

Completion Time Frame	DCR: Update the State Forest Action Plan to enhance climate change mitigation and adaptation strategies.	
Less than 3 years	Action Description:	Update State Forest Action Plan to incorporate strategies to deal with future conditions presented by a warming planet. These concepts will be incorporated into the 2020 update of the Plan.
	Executive Office:	Executive Office of Energy and Environmental Affairs
	Lead Agency:	Department of Conservation and Recreation (DCR)
	Partner(s):	MassWildlife
	Agency Priority Score:	Medium
	Possible Funding Source(s):	State Funding - Operating Budget
	SHMCA Goal(s):	1, 2, 3
	Primary Climate Change Interaction(s):	Precipitation Changes, Rising Temperatures
Completion Time Frame	DEP: Vulnerability assessment of hazardous waste sites.	
Less than 3 years	Action Description:	Conduct a vulnerability assessment of thousands of waste sites in state. Prioritize high concern based on water resources and indoor protections. Pilot studies of at risk sites for adaptations/mitigation measures. Provide assessment results to MVP Planning.
	Executive Office:	Executive Office of Energy and Environmental Affairs
	Lead Agency:	Department of Environmental Protection (DEP)
	Partner(s):	OTA
	Agency Priority Score:	Medium
	Possible Funding Source(s):	State Funding - Operating Budget
	SHMCA Goal(s):	3
	Primary Climate Change Interaction(s):	Precipitation Changes, Sea Level Rise, Rising Temperatures, Extreme Weather, Earthquake

2018 MassDEP Vulnerability Report

- The Bureau of Waste Site Cleanup assessed the vulnerability of open hazardous waste sites undergoing cleanup as well as those with Activity and Use Limitations, and active sites to various climate changes impacts including storm surge and flooding. The agency plans to update this analysis with new statewide data over the coming years and will be partnering with the Sustainable Remediation Forum (www.sustainableremediation.org), EcoAdapt (www.ecoadapt.org) and now the Mystic River Watershed Association (<https://mysticriver.org>) on a first in the nation pilot project. (expected completion 2019)



BWSC Climate Related Initiatives

- ✓ Greener Cleanups
- ✓ ER Capabilities
- Vulnerability Assessment and Adaptation of Waste Sites (Mitigation/Adaptation)
- Natural Resource Damages Restoration
 - Restoration/climate related projects including: dam removals/culvert removals (fish passage) and wetlands restoration
- Holt Road Landfill, Superfund O&M
- Regulatory, Guidance & Policy Consideration

2018 Waste Sites Vulnerability Assessment - *Partners*



- The Sustainable Remediation Forum (SURF) promotes the use of sustainable practices during the investigation, construction, remediation, redevelopment, and monitoring of environmental cleanup sites, with the objective of balancing economic viability, conservation of natural resources and biodiversity, and the enhancement of the quality of life in surrounding communities.
- Sustainable Remediation Forum, Inc. is a 501(c)(3) New Jersey nonprofit corporation.



- “EcoAdapt was founded to offer adaptation support, training, and assistance to make planning and management outcomes less vulnerable to climate change.”
- EcoAdapt is a 501(c)(3) tax-exempt nonprofit organization based in Washington, USA.



- The Mystic River Watershed Association (MyRWA) was founded in 1972 to protect and restore natural resources in the 22-community watershed. MyRWA accomplishes this work through the efforts of professional staff and thousands of volunteers working together on a project-by-project basis.

SURF: “Climate Change and Resilience within Contaminated Lands Rehabilitation State of Massachusetts Pilot Project “

TASKS

1. Vulnerability Screening of *statewide* universe of waste sites including:

- “Open” sites
- Active Remedial Systems
- Engineered Barriers
- AUL’s

Utilize 2018 MA Climate Change Clearinghouse data



2. Prioritize 2 – 3 sites for limited scope vulnerability assessments and adaptation planning of diverse issues:

- Contaminant mobility
- Proximity to sensitive aquatic and human communities

SURF: “Climate Change and Resilience within Contaminated Lands Rehabilitation State of Massachusetts Pilot Project “ (cont.)

TASKS

3. *DRAFT* Guidance and Best Practices Document for MassDEP/BWSC
4. Data availability for the Municipal Vulnerability Preparedness (MVP) Program and municipal planning

TASKS

5. Data availability for BWSC’s regulated community, stakeholders and Licensed Site Professionals (LSPs)

Adaptation Considerations

- **PRIORITIZATION OF VULNERABILITIES?**
 - Drinking Water Resource Area Protections
 - Sensitive Receptors
 - Priority pathways - Indoor Air (e.g. AEPMM)
- **EVALUATING OPTIONS FOR ADAPTATION AND RESILIENCY MEASURES**
 - Physically Secure the system
 - E.g. Backup power, insulated well heads
 - Provide additional barriers to protect the system
 - E.g. flood controls, barriers
 - Alerts to project personnel of system compromises
 - E.g. alarm systems
- **INCENTIVE PROGRAMS/GRANTS – WHERE'S THE \$\$?**
 - DOER
 - MassCEC
 - Foundations

WASTE SITES: Potential Adaptation Measures

Adaptation measures

- Treatment specific
 - Groundwater remediation
 - Landfills/containment
 - Sediment containment
- Site-specific

	Climate Change Impacts					Potential Adaptation Measures for System Components
	Temperature	Precipitation	Wind	Sea Level Rise	Wildfires	
Groundwater Extraction or Containment System		♦				Dewatering well system <i>Installing additional boreholes at critical locations and depths to maintain target groundwater levels in the extraction/containment zone and reduce groundwater upwelling while not compromising the remediation system</i>
	♦	♦	♦	♦	♦	Remote access <i>Integrating electronic devices that enable workers to suspend pumping during extreme weather events, periods of impeded access, or unexpected hydrologic conditions</i>
	♦	♦	♦			Well-head housing <i>Building insulated cover systems made of high density polyethylene or concrete for control devices and sensitive equipment situated aboveground for long periods</i>
Aboveground Components of the Treatment System	♦	♦	♦	♦	♦	Alarm networks <i>Integrating a series of sensors linked to electronic control devices that trigger shutdown of the system, or linked to audible/visual alarms that alert workers of the need to manually shut down the system, when specified operating or ambient parameters are exceeded</i>
		♦	♦	♦		Coastal hardening <i>Building "soft" seawalls (through techniques such as replenishing sand and/or vegetation), jetties or groins to stabilize and shield a shoreline from erosion; in some cases, "hard" seawalls (such as those made of reinforced concrete) may be warranted</i>
	♦	♦		♦		Concrete pad fortification <i>Repairing concrete cracks, replacing pads of insufficient size or with insufficient anchorage, or integrating retaining walls along the pad perimeter</i>
					♦	Fire barriers <i>Creating buffer areas (land free of dried vegetation and other flammable materials) around the treatment system and installing manufactured systems (such as radiant energy shields and raceway fire barriers) around heat-sensitive components</i>
		♦		♦		Flood controls <i>Building one or more structures to retain or divert floodwater, such as vegetated berms, drainage swales, levees, dams or retention ponds</i>
	♦	♦	♦	♦	♦	Power from off-grid sources <i>Constructing a permanent system or using portable equipment that provides power generated from onsite renewable resources, as a primary or redundant power supply that can operate independent of the utility grid when needed</i>
		♦	♦	♦		Relocation <i>Moving the system or its critical components to positions more distant or protected from potential hazards; for flooding threats, this may involve elevations higher than specified in the community's flood insurance study</i>

EPA Climate Change Adaptation Factsheet – Groundwater remediation systems

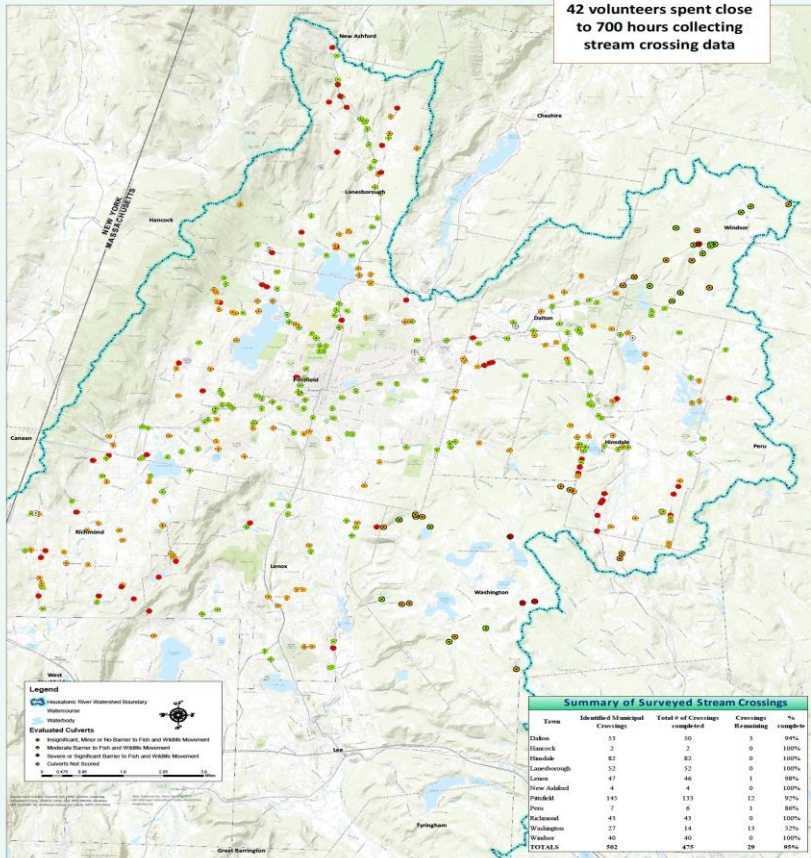
Natural Resource Damages Culvert Replacements



NRD Round 2 - 2011- 2013 River Continuity

In Partnership with Berkshire Environmental Action Team

42 volunteers spent close
to 700 hours collecting
stream crossing data



Housatonic Valley Association Clean Water for Life!
14 Main Street, Stockbridge MA 01262
413-298-7024



What are Other States Doing?

Washington

- Guidance: “**Adaptation Strategies for Resilient Remedies**” (Washington State Department of Ecology, 2017).
- The WA DOE guidance is intended to (1) Help understand site-specific vulnerabilities of cleanup sites to climate change impacts and (2) Provide recommendations to increase resilience of remedies at each phase of cleanup
- The guidance focuses on four climate change impacts: **Sea-level rise, Flooding, Landslides; and Wildfires.**



Adaptation Strategies for Resilient Cleanup Remedies

*A Guide for Cleanup Project Managers to
Increase the Resilience of Toxic Cleanup Sites to
the Impacts from Climate Change*

November 2017
Publication no. 17-09-052

Other States (cont.)

New Jersey

- 2016 New Jersey State Department of Environmental Protection developed response strategy guidance
- Targeted to site owners, PRPS and LSRPs
- After storms, all sites should be re-evaluated to determine if any immediate environmental concerns needing action and whether site conditions changed requiring reassessment.

California

- California Department of Toxic Substances Control
- Developing climate change guidance specific to hazardous waste treatment, storage and disposal facilities, and the cleanup of contaminated sites.
- EcoAdapt work with waste sites in San Francisco Bay Area – cross-project information exchange with Massachusetts

ASTM Guidance

- **Climate Resiliency Planning and Strategy (E3032-15e1)**
- **Climate Resiliency in Water Resources (ASTM WK55606)**
- Addresses **extreme weather**
- Reflects general risks for certain regions of the country with its matrix approach
- Discusses impacts to ecosystems, global repercussions and vulnerable communities.
- Looks at effective scale of adaptation (site, town, watershed)
- Recommends setting priorities – e.g., drought and heat events, extreme runoff and flooding, storm damage to infrastructure, sea level rise.

Massachusetts Climate Change Resources

MassDEP Climate & Clean Energy

- <https://www.mass.gov/climate-clean-energy>

Climate Change Clearinghouse for the Commonwealth

- <http://resilientma.org/>

Thank You!

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Climate & Clean Energy Program Website:

<https://www.mass.gov/climate-clean-energy>